

AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior listings of claims in the present application.

What Is Claimed Is:

1. (currently amended) A packet transfer path control apparatus which controls a transfer of a unicast packet and a multicast packet, comprising:

an output port determination unit determining an output port through which a packet input from any of one or more input ports is to be output, and assigning output order identification information for designation of an output order of the packet, the output order of the packet indicating an input order of the packet among a plurality of input packets including both the unicast packet and the multicast packet and indicating whether the unicast packet arrives earlier than the multicast packet;

a packet data storage unit storing data of the plurality of input ~~packet~~ packets; and

a plurality of packet output units respectively corresponding to the plurality of output ports, each packet output unit reading data of a packet determined by said output port determination unit to be output through a corresponding output port associated with the packet output unit in an output order indicated by the output order identification information from said packet data storage unit, and outputting the read data through the corresponding output port.

2. (original) The apparatus according to claim 1, further comprising:

a unicast packet management information storage unit storing for each output port management information including a storage position in said packet data storage unit of the data

of each unicast packet to be output through the output port and output order identification information for the unicast packet; and

a multicast packet management information storage unit provided for each output port and storing, for each of the multicast packets to be output through the output port, management information including a storage position in said packet data storage unit of the data of the multicast packet and output order identification information of the multicast packet.

3. (original) The apparatus according to claim 2, wherein

said packet output unit for each output port compares output order identification information about a next output unicast candidate of packets whose packet management information is stored in said unicast packet management information storage unit with output order identification information about a next output multicast candidate of packets whose packet management information is stored in said multicast packet management information storage unit, and determining a packet to be output next from the output port.

4. (original) The apparatus according to claim 1, wherein

said output order identification information is serial numbers indicating input orders of all packets input through all input ports, or a serial number for all packets input through each output.

5. (currently amended) A packet transfer path control apparatus which controls a transfer of a unicast packet and a multicast packet, comprising:

an output port determination unit determining an output port through which a packet input from any of one or more input ports is to be output;

a pointer storage unit storing for each output port a pointer to a location where there is stored data of a last input one of the unicast packets to be output through the output port or packet management data for the last input unicast packet;

a packet data storage unit storing data of a plurality of each input packet~~packets~~ including both the unicast packet and the multicast packet;

a packet output unit provided for each output port, reading data of a packet determined by said output port determination unit to be output through the output port in an output order for guarantee of an input/output order of ~~a~~the unicast packet and ~~a~~the multicast packet based on stored contents of said pointer storage unit from said packet data storage unit, the output order indicating an input order of the packet among the plurality of input packets and indicating whether the unicast packet arrives earlier than the multicast packet, and outputting the read data through the output port.

6. (original) The apparatus according to claim 5, further comprising:

a unicast packet management information storage unit storing for each output port packet management information including a storage position in said packet data storage unit for data of each unicast packet to be output through the output port; and

a multicast packet management information storage unit provided for each output port and storing packet management information including a storage position in said packet data storage unit for data of each multicast packet to be output through the output port, and a value of a pointer read corresponding to the output port from said pointer storage unit when the multicast packet is input.

7. (currently amended) The apparatus according to claim 6, wherein

said pointer points to ~~a~~the storage position in said packet data storage unit for data of a last input unicast packet, or a storage position of packet management information corresponding to the unicast packet in said unicast packet management information storage unit.

8. (currently amended) The apparatus according to claim 7, wherein

said packet output unit for each output port storing ~~a~~the storage position in said unicast packet management information storage unit of packet management information for ~~a~~the unicast packet output immediately before from the output port, comparing, when a next packet is to be output through the output port, ~~a~~the value of the pointer to a next output candidate of multicast packets whose packet management information is stored in said multicast packet management information storage unit with the storage position, and outputting a multicast packet when the value match the storage position or outputting a unicast packet when the value does not match the storage position.

9. (currently amended) A computer-readable recording medium having recorded thereon a computer-executable program, the program used to direct a computer to control a transfer of a unicast packet and a multicast packet, comprising:

a procedure of determining one of output ports through which one a packet input through an input port is to be output;

a procedure of, if the input packet is ~~a~~the unicast packet to be output through the one output port, writing, for the one output port, order identification information assigned for the unicast packet in a table storing for each output port the management information about each

unicast packet to be output thorough the output port, the order identification information being assigned to all packets to be output through all of the output ports or all packets to be output through each port in to input order; and

a procedure of, if the input packet is ~~a~~the multicast packet to be output through the one output port, writing order identification information assigned for the multicast packet in a table provided for the one output port and storing the management information about each multicast packet to be output through the one output port, the order identification information being assigned to all packets to be output through all of the output ports or all packets to be output through each port in to input order;

wherein an output order of the packet indicates the input order of the packet among a plurality of input packets including both the unicast packet and the multicast packet and indicating whether the unicast packet arrives earlier than the multicast packet.

10. (currently amended) The ~~program~~computer-readable recording medium according to claim 9, wherein the program further comprising~~comprises~~:

a procedure of reading order identification information about ~~a~~the unicast packet to be output next from a table storing unicast packet management information corresponding to an output port, and reading order identification information about ~~a~~the multicast packet to be output next from a table storing multicast packet management information; and

a procedure of comparing the two read values of order identification information, and determining which packet is to be output next through the output port, ~~a~~the unicast packet or the multicast packet.

11. (currently amended) A computer-readable recording medium having recorded thereon a computer-executable program, the program used to direct a computer to control a transfer of a unicast packet and a multicast packet, comprising:

a procedure of determining one of a plurality of output ports through which ~~one~~ a packet input through an input port is to be output;

a procedure of, when the input packet is ~~a~~the unicast packet, storing for the one output port a storage address in a table storing management information about the input packet or a storage address in a table storing the data of the input packet a plurality of input packets including both the unicast packet and the multicast packet;; and

a procedure of, when the packet is ~~a~~the multicast packet, writing in a table storing management information about ~~a~~the multicast packet for each output port through which the packet is to be output a storage address in a table storing management information about ~~a~~the unicast packet stored corresponding to the one output port or a storage address in a table storing the data of the packet;

wherein an output order of the packet indicates the input order of the packet among the plurality of input packets and indicating whether the unicast packet arrives earlier than the multicast packet.

12. (currently amended) The computer-readable recording medium~~program~~ according to claim 11, wherein the program further comprising~~comprises~~:

a procedure of reading a storage address in a table storing management information about the unicast packet corresponding to ~~a~~the multicast packet to be next output, or a storage address

in a table storing data of ~~a~~the unicast packet from a table storing management information about a multicast packet for each output port;

a procedure of comparing the read storage address in a table storing management information about the unicast packet or a storage address in a table storing data of the unicast packet with a storage address in a table storing management information about the last output unicast packet or the storage address in a table storing the data of the packet, and determining which is to be output from the output port, ~~a~~the unicast packet or ~~a~~the multicast packet; and

a procedure of, when ~~a~~the unicast packet is output, storing a storage address in a table storing management information about the unicast packet to be output or a storage address in a table storing data of the packet.

13. (currently amended) A packet transfer path control apparatus which controls a transfer of a unicast packet and a multicast packet, comprising:

output port determination means for determining an output port through which a packet input from any of one or more input ports is to be output, and assigning output order identification information for designation of an output order of the packet;

packet data storage means for storing data of ~~the~~a plurality of input packet~~packets~~
including both the unicast packet and the multicast packet; and

packet output means provided for each of a plurality of output ports for reading data of a packet determined by said output port determination unit to be output through the output port in an output order indicated by the output order identification information from said packet data storage means, the output order indicating an input order of the packet among the plurality of

input packets and indicating whether the unicast packet arrives earlier than the multicast packet,
and outputting the read data through the output port.

14. (currently amended) A packet transfer path control apparatus which controls a transfer of a unicast packet and a multicast packet, comprising:

output port determination means for determining an output port through which a packet input from any of one or more input ports is to be output;

pointer storage means for storing for each output port a pointer to a last input one of unicast packets to be output through the output port, or packet management information about the last input unicast packet;

packet data storage means for storing data of a plurality of each input packet~~packets~~
including both the unicast packet and the multicast packet;

a plurality of packet output means provided for a plurality of output ports for reading data of a packet determined by said output port determination means to be output through the output port in an output order for guarantee of an input/output order of ~~a~~the unicast packet and ~~a~~the multicast packet based on stored contents of said pointer storage means from said packet data storage means, the output order indicating an input order of the packet among the plurality of input packets and indicating whether the unicast packet arrives earlier than the multicast packet,
and outputting the read data through the output port.